भारतीय मानक

Indian Standard

IS 1234 : 2023

झरझरा सतहों को चिह्नित करने के लिए तेल आधारित स्याही (स्टैंसिल प्लेटों के साथ या बिना) — विशिष्टि

(दूसरा पुनरीक्षण)

Oil Based Ink for Marking Porous Surfaces (with or without Stencil Plates) — Specification

(Second Revision)

ICS 87.080

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July 2023 **Price Group 6**

Printing Inks, Stationery and Allied Products Sectional Committee, CHD 14

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Printing Inks, Stationery and Allied Products Sectional Committee had been approved by the Chemical Division Council.

This standard was originally published in 1957. In the first revision, the requirement for fineness of grind, skinning properties and accelerated weathering were added and the requirements for residue on sieve, non-volatile vehicle, and miscibility with petroleum hydrocarbon solvents were deleted. In this revision, Reference clause, Packing and Marking clause have been incorporated. Also, Amendment no. 1 has been included in this revision.

The composition of the Committee responsible for formulation of this standard is given in Annex J.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

OIL BASED INK FOR MARKING POROUS SURFACES (WITH OR WITHOUT STENCIL PLATES) — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard covers the requirements and the methods of sampling and test for ink suitable for application to porous surface, namely, crates, wooden boxes, cardboard cartons and hessian bags.

1.1.1 The ink complying with this specification is suitable for application by stencil brush and stencil board, and by automatic stencilling machine.

2 REFERENCES

2.1 The Indian Standards given below contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards.

IS No.	*Title*
IS 101	Methods of sampling and test for paints, varnishes and related products:
(Part 1/Sec 1) : 1986	Tests on liquid paints (general and physical), Section 1 Sampling (*third revision*)
(Part 3/Sec 1) : 1986	Tests on paint film formation, Section 1 Drying time (*third revision*)
IS 264 : 2005	Nitric acid — Specification (*third revision*)
IS 266 : 1993	Sulphuric acid — Specification (*third revision*)
IS 336 : 2021	Ether — Specification
IS 1070 : 1992	Reagent grade water — Specification (*third revision*)
IS 1448 (Part 66) : 1969	Methods of test for petroleum and its products [p:66] flash point (Open) and fire point by pensky martens apparatus

3 REQUIREMENTS

3.1 Description

The ink shall consist of a dispersion of pigment or dye in a suitable vehicle.

3.1.1 The ink shall dry to produce uniform and legible flat or egg-shell marking.

3.1.2 The ink shall be supplied ready to use; when necessary it may be thinned in accordance with the manufacturer's instructions.

3.1.3 The ink shall not skin, curdle, settle, thicken or cake in the original unopened container. If the ink has any separation, it shall readily mix to a uniform condition by stirring and shall meet the requirements of this specification.

3.2 Colour

The colour of the ink shall be as agreed to between the purchaser and the supplier.

3.3 Drying Time

The material shall dry in not more than 30 min when tested by the method prescribed in Annex A.

3.4 Hiding Power

The material shall hide the contrasting surface completely when applied at the rate of 8 square metres per litre when tested as prescribed in Annex B.

3.5 Fineness of Grind

The ink shall be free from any gritty particles.

3.6 Freedom from Toxic and Noxious Material

The ink shall be free from benzene, chlorinated compounds, aniline oil, and other noxious or toxic materials when tested as prescribed in Annex C.

3.7 Skinning Properties

The ink shall be non-skinning when tested by the method prescribed in Annex D.

3.8 Effect on Stencil Brush

After being allowed to dry on a stencil brush the ink shall be removed by immersing and cleaning the brush in petroleum hydrocarbon solvent when tested as prescribed in Annex E. This treatment shall leave the brush in clean condition, free from hard and gummy deposit.

3.9 Accelerated Weathering Test

When applied to white pine wood panel and tested as prescribed in Annex F the ink shall with stand 24 h cycles of accelerated weathering without cracking, peeling or flaking and, at the end of this period, shall show not more than slight chalking or change of colour.

3.10 Application Properties

When applied by stencil brush or fountain brush to white pinewood and tested as prescribed in Annex G, the ink shall leave clean stencil marks free from ragged edges, smudges and smears. The ink shall be satisfactorily retained in the brush without dripping.

3.11 Flash Point

The flash point shall be not below 65.5 °C when tested as prescribed in Annex H.

4 PACKING AND MARKING

4.1 Packaging

The material shall be packed in closed containers as agreed to between the purchaser and the supplier.

4.2 Marking

The packages shall be securely closed and bear legibly and indelibly the following information:

a) Name and grade of the material;

b) Name of the manufacturer and his recognized trade mark, if any;

c) Gross and net mass;

d) Date of manufacture ; and

e) Batch number.

4.2.1 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed there under, and the products may be marked with the Standard Mark.

5 SAMPLING

5.1 Representative test samples of the material shall be drawn as prescribed in **3** of IS 101 (Part 1/Sec 1).

5.2 Number of Tests

Tests for all the requirements given in **3** of the specification shall be conducted on the composite sample.

5.3 Criteria for Conformity

The lot shall be declared as conforming to the requirements of the specification if all the test results on the composite sample satisfy the relevant specification requirements.

ANNEX A

(*Clause* 3.3)

TEST FOR DRYING TIME

A-1 PROCEDURE

A-1.1 Stencil a number of letters about 2 cm high by means of a stencil brush and stencil board on a well-seasoned teak wood panel [*see* IS 101 (Part 3/Sec 1)] using the material under test. Apply the material just sufficient to make legible opaque letters without smeering and let stand for 30 min.

A-1.1.1 The material shall be taken to have passed the test if rubbing with a finger under moderate pressure docs not pick up, smudge or smeer the stencilled letters.

ANNEX B

(*Clause* 3.4)

TEST FOR HIDING POWER

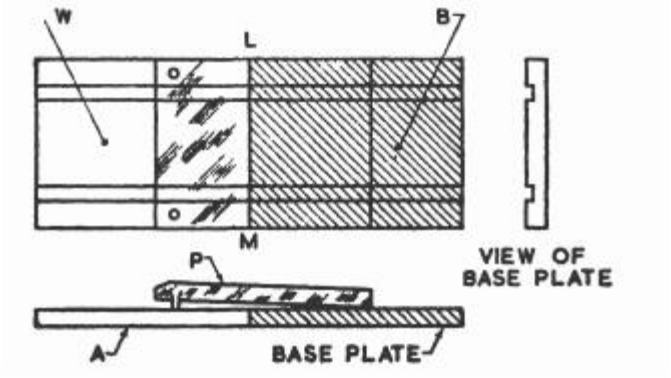

FIG. 1 BLACK AND WHITE CRYPTOMETER

B-1 APPARATUS

B-1.1 *P* Fund Cryptometer

The cryptometer as shown in Fig. 1 consists of the following parts:

B-1.1.1 *Base Plate* (*A* in Fig. 1)

It consists of two glass plates, black (*B*) and white (*W*) fused together along the line *LM*. The reflection coefficients for the white and black parts of the base plate are 80.5 percent and less than 5 percent, respectively. Along the two longer edges and perpendicular, to the line *LM*, there are two parallel shallow grooves. In the black as well as white glass plates, there are two millimetre scales along the grooves with '*O*' graduation at the dividing line *LM* between the black and white halves. The upper surface of the base plate of both black and white glass is optically flat.

B-1.1.2 *Top Plate* (*P* in Fig. 1)

It is made of clear glass with its lower surface optically flat. When placed on the base plate, the lower side of the top plate facing the base plate has two small steel legs which form a wedge-shaped film of the ink between the base and the top plates. Two top plates with different wedge-angle constants are supplied for use with: (a) black and dark inks, and (b) white and light coloured inks.

B-2 PROCEDURE

B-2.1 Place a few drops of the ink sufficient to fill the wedge-shaped clearance between the base plate and the top plate along the dividing line *LM* between black and white halves of the base plate. Carefully place the top plate on the ink, eliminating bubbles. Gradually draw the top plate along the length of the base plate so that the dividing line just disappears. Note the scale reading at the point of contact with the top plate. Then move the top plate in the opposite direction till the line of demarcation re-appears. Again record the scale reading at the point of contact with the top plate. Repeat the experiment ten times and calculate the mean for ten pairs of observations (that is 20 readings) for disappearance

and re-appearance of the dividing line *LM* of the black and white halves.

B-3 CALCULATION

B-3.1 Hiding power per litre = $\frac{1}{KL} m^2$

where

K = wedge-angle constant engraved on the top plate, and

L = mean scale reading.

ANNEX C

(*Clause* 2.6)

TEST FOR TOXIC OR NOXIOUS MATERIALS

C-1 QUALITY OF REAGENTS

C-1.1 Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

C-2 TEST FOR BENZENE

C-2.1 Reagents

C-2.1.1 *Orthophosphoric Acid* — about 85 percent

C-2.1.2 *Concentrated Sulphuric Acid* — *see* IS 266

C-2.1.3 *Acid Mixture* — Mix 170 ml of orthophosphoric acid with 100 ml of concentrated sulphuric acid.

C-2.1.4 *Concentrated Nitric Acid* — *see* IS 264

C-2.1.5 *Dimethyl Sulphate*

CAUTION — Care should be taken in handling dimethyl sulphate as its fumes produce violent inflammation of the larynx, bronchial tubes and eyes; the liquid produces blisters and bad sores on the skin.

C-2.2 Procedure

C-2.2.1 Place 150 ml of the material in a distillation flask, add 150 ml of water, and distil the mixture slowly; avoiding overheating of the material. Collect the fraction (*A*) distilling up to 80 °C and continue distillation and collect another 60 ml (*B*) of the non-aqueous liquid in a separate receiver.

C-2.2.2 Shake fraction (*A*) with its own volume of acid mixture in a separating funnel. If there are two layers, retain the upper layer. If there is no separation of layers, discard the whole fraction. Treat fraction (*B*) similarly. Mix the upper layers from (*A*) and (*B*), wash with water and dry, first over calcium chloride and then over potassium hydroxide. Distil the liquid through a fractionating column. Collect the fraction boiling between 75 °C and 85 °C.

C-2.2.3 If there is no distillate below 85 °C, benzene shall be taken to be absent. If there is distillate between 75 °C and 85 °C, identify it by odour, refractive index (refractive index of benzene is 1.502 at 30 °C) or by the procedure given under **C-2.2.4.**

C-2.2.4 Mix 10 ml of the distillate obtained between 75 °C and 85°C (*see* **C-2.2.1**) with 20 ml dimethyl sulphate. Remove the upper layer and distil the lower layer up to 125 °C. Add 3 drops of this distillate to a mixture of 1 ml concentrated sulphuric acid and 1 ml concentrated nitric acid contained in a test tube and boil for 30 s. After cooling, add 10 ml of water. A flocculent precipitate of *m*-dinitrobenzene (mp 89.9 °C) or of nitrobenzene confirms the presence of benzene.

C-3 TEST FOR CHLORINATED COMPOUNDS

C-3.1 Procedure

Steam-distil 100 ml of the material, using a receiver cooled in ice. Separate the lower layer of the distillate, dry and redistil. Collect the fraction boiling between 60 °C and 100 °C. Wash the fraction several times with water and determine the relative density and boiling range of the residual liquid.

C-3.1.1 The material shall be regarded as free from undesirable chlorine compounds if the relative density is not more than 1.2 at 15 °/15 °C and the boiling point not above 60 °C.

C-4 TEST FOR ANILINE OIL

C-4.1 Reagent

C-4.1.1 Dilute Hydrochloric Acid — 1 : 4 by volume

C-4.1.2 Concentrated Sulphuric Acid — *see* IS 266

C-4.1.3 *Ether* — solvent grade (*see* IS 336)

C-4.1.4 *Manganese Dioxide*

C-4.2 Procedure

Separate the vehicle (oil) from the pigment by extraction. Distil off the solvent from the conical flask and heat the flask to constant mass in a vacuum oven or in non-oxidizing atmosphere at a temperature of 100 °C ± 2 °C. Allow to cool. Dissolve 5 ml to 10 ml of the resulting vehicle in about 50 ml of ether and extract with 25 ml of the dilute hydrochloric acid. Wash the hydrochloric acid extract which contains the aniline oil, a few times with 10 ml portions of ether and then evaporate to a small volume. To a small portion of the residue add a few drops of concentrated sulphuric acid and a small quantity of manganese dioxide.

C-4.2.1 The material shall be taken as free from aniline oil if no blue or greenish blue colour develops.

ANNEX D

(*Clause* 3.7)

TEST FOR SKINNING PROPERTIES

D-1 PROCEDURE

D-1.1 Half fill a 250 ml can with the material, cover with a tight fitting lid and then invert. Allow the container to stand inverted for 48 h at a temperature of 23 °C ± 2 °C. At the end of this period, remove the original bottom of the container with a can opener, and examine the sample. The ink shall be considered satisfactory if there is no skin formation on the top.

ANNEX E

(*Clause* 3.8)

TEST FOR EFFECT ON STENCIL BRUSH

E-1 PROCEDURE

E-1.1 Wet a stencil brush thoroughly with the test sample and allow the excess to drain off. Lay the brush on its side so that the bristles do not touch an absorbent surface and allow it to remain for 18 h. Immerse the brush in the thinner for 15 min, then rinse with thinner, dry and examine.

ANNEX F

(*Clause* 3.9)

ACCELERATED WEATHERING TEST

F-1 PROCEDURE

F-1.1 Stencil 5 or 6 letters 18 mm high on three panels of white pine wood 15 cm × 7·5 cm × 9 cm using a stencil brush and a stencil board, applying enough ink to give clear legible letters without smearing. Allow the lettered panels to dry for 24 h in a chamber free from dust, fumes and no direct sunlight falling on the panels. The temperature of the chamber shall be kept at 27 °C ± 2 °C and relative humidity at 50 percent ± 2 percent.

F-1.2 The material shall be considered to have passed the test if there are no signs of any cracking, peeling or flaking and there is not any appreciable change of colour.

ANNEX G

(*Clause* 3.10)

TEST FOR APPLICATION PROPERTIES

G-1 PROCEDURE

G-1.1 Apply the ink on a white pine wood panel through a sharply cut stencil with a stencil brush or a fountain brush. Apply only sufficient ink to make legible opaque letters. Lift the stencil straight up and examine the letters. The ink shall be considered satisfactory if the letters stencilled on the wood are clear, distinct and there shall be no sign of smudginess and feathering. Fill the bristles of the brush with ink and hold the brush vertically to determine whether the ink drips.

ANNEX H

(*Clause* 3.11)

DETERMINATION OF FLASH POINT (OPEN) BY PENSKY-MARTENS APPARATUS

H-1 APPARATUS

H-1.1 The Pensky-Martens tester with the low range thermometer as prescribed in IS 1448 (Part 66) shall be used with the following modifications.

H-1.1.1 The cover of the cup shall be replaced by a clip which encircles the upper rim of the cup and carries the thermometer and test-flame. The tube carrying the thermometer shall have its centre on radius at approximately 90° to the radius passing through the point of attachment of the test-flame, and shall be of such a height that when the thermometer is in position its bulb shall be in the vertical axis of the cup and below the filling line. The test-flame shall be fixed on the vertical axis of the cup and on level with the upper edge of the cup.

H-1.1.2 Precautions shall be taken to shield the apparatus from draughts.

H-2 PROCEDURE

H-2.1 Clean and dry all parts of the cup and its accessories thoroughly before starting the test. Take particular care to remove the presence of any solvent used to clean the apparatus after a previous test. Fill the cup with the material to be tested, up to the level indicated by the filling mark. Place the clip carrying the thermometer and test-flame on the cup and set the latter in the stove. Take care that the locating devices are properly engaged. Insert the low range thermometer [*see* IS 1448 (Part 66)].

H-2.2 Light and adjust the test-flame so that it is of the size of a bead 4 mm in diameter. Apply heat at such a rate that the temperature recorded by the thermometer increases not less than 5 °C nor more than 6 °C per min. (Carefully observe the surface of the oil).

H-2.3 The open flash point shall be taken as the temperature at which a flash first appears at any point on the surface of the oil.

ANNEX J

(*Foreword*)

COMMITTEE COMPOSITION

Printing Inks, Stationery and Allied Products Sectional Committee, CHD 14

Organization	*Representative(s)*
Govt Printing, Govt of West Bengal	SHRI SUBIR KUMAR MANDAL, **(*Chairperson*)**
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SCIENTIST 'D'/JOINT DIRECTOR
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